Redescription of Bathyconchoecia pacifica Chavtur, 1977 (Ostracoda, Halocyprididae) from the North Pacific

AUTHOR(S):

Chavtur, Vladimir G.

CITATION:

Chavtur, Vladimir G.. Redescription of Bathyconchoecia pacifica Chavtur, 1977 (Ostracoda, Halocyprididae) from the North Pacific. Publications of the Seto Marine Biological Laboratory 2014, 42: 1-13

ISSUE DATE:

2014-04-10

URL:

http://hdl.handle.net/2433/185699

Publ. Seto Mar. Biol. Lab., 42: 1–13, 2014

Redescription of *Bathyconchoecia pacifica* Chavtur, 1977 (Ostracoda, Halocyprididae) from the North Pacific

VLADIMIR G. CHAVTUR

A.V. Zhirmunsky Institute of Marine Biology, Far East Branch, Russian Academy of Sciences,
Vladivostok 690041, Russia
Far Eastern Federal University, Vladivostok 690050, Russia
E-mail: vchavtur@gmail.com

Abstract *Bathyconchoecia paulula pacifica* Chavtur, 1977, from the Kurile-Kamchatka Trench is redescribed and raised to specific rank. Comparisons are made between this species and the other species in the *B. paulula* species complex. A key is given whereby the three species in the complex can be discriminated.

Keywords: pelagic ostracods, Halocyprididae, Bathyconchoeciinae, *Bathyconchoecia*, taxonomy, morphology, North Pacific

Introduction

Deevey (1968) established the genus *Bathyconchoecia* and included eight species and designating *B. paulula* as the type species. She described this species from material collected at 28°15' N, 87°02' W in the Gulf of Mexico from a depth of 1000 m. Poulsen (1972) reported the occurrence of specimens of *B. paulula* from plankton hauls collected by French bathyscaph "Archimede" off the Azores Islands (37°23' N, 25°45' W) at the depth of 680–780 m. However, the single female specimen he studied is apparently other species, since the rostrum of its carapace is sharply down-bent, regrettably Poulsen in failing to recognize to novelty of his specimen, only illustrated the shell, and did not describe any other features.

When analysing a series of plankton samples collected from the Kurile-Kamchatka Trench at a depth range of 5000–9500 m by the Russian R/V "Vityaz" in 1969, I found some specimens clearly belonging to the genus *Bathyconchoecia* and closely resembling, but not identical to the genus′s type-species. These specimens were originally designated as *B. paulula pacifica* Chavtur, 1977, a subspecies of the type species. My original description for this subspecies was brief and contained some errors of description and illustration.

In 1984, further specimens of *Bathyconchoecia* were collected in the Guaymas Basin at a depth of 2000 m at 27°0.42'N, 111°24.30'W, by American submersible "Alvin", which were identified by Kornicker (1991) as being *B. paulula.* Kornicker remarked that "the specimens differ in some small details from type specimens from the Gulf of Mexico and could be a new subspecies, however, additional studies of populations from both areas would be necessary to determine variability of the species".

Based on comparisons between my material and Deevey′s and Kornicker′s descriptions, I have decided that

the specimens from each collection differs markedly from each other and consequently merit being raised to specific rank. *Bathyconchoecia paulula pacifica* is renamed *Bathyconchoecia pacifica*. *Bathyconchoecia paulula* sensu Kornicker (1991) is apparently an undescribed one and would be described later somewhere

A detailed redescription for *B. pacifica* is given below, together with a key to the three species.

The following abbreviations are used in the illustrations:

1–5 – first–fifth segments of the first antenna, seventh limb and on the endopodite of second antennae

pr – protopodite

ep – epipodite

bas – basale

ex – exopodite

en, en1, en2, en3 – endopodite, first–third segments on the endopodite of the second antenna, maxilla, fifth and sixth limbs

ep.p. – epipodial plate on the fifth and sixth limbs

cx – coxale

prcx - precoxale

c.e – cutting edge on the coxale of the mandible

e.b. – endite on the basale of the mandible

I, II – first and second endites on the fifth limb

ho – hook on the endopodite of the second antenna

Taxonomy

Order HALOCYPRIDA Dana, 1853
Suborder Halocypridina Dana, 1853
Superfamily Halacypridoidea Dana, 1853
Family Halocyprididae Dana, 1853
Subfamily Bathyconchoeciinae Angel & Gravel, 2013
Genus *Bathyconchoecia* Deevey, 1968

Bathyconchoecia pacifica Chavtur, new status
(Figs. 1–6)

Bathyconchoecia paulula pacifica Chavtur, 1977a: 138–140; figs. 1, 2; 1991: 43; 1992: Table 2.

Holotype. 2780, adult female (ex N 1524), length 0.97 mm, appendages mounted on slide and valves in alcohol, in collection of the Museum of Institute of Marine Biology, Vladivostok, Russia (together with paratype).

Type Locality. *Vityaz* station 5626, position 45°11’N. 152°28’E, sample 180, depth estimated 9000–7000 m, August 24, 1966.

Paratype. N 2781, adult female (ex N 1525), length 0,90 mm, appendages on slide and valves in alcohol. *Vityaz* station 5626, sample 181, depth estimated 7000–6000 m.

Table 1. Records of *Bathyconchoecia pacifica*

Additional material studied				
Vityaz station	Date	Depth, m	Position	Material
6512 (sample 74)	31 July '66	7000–6000	45^{0}43 'N. 153^{0}25'E	N 2782, A-1♀ 0.8mm
6526 (sample 184)	25 Aug '66	6000–5000	45^{0}11 'N. 152^{0}28'E	N 2783, A-1♀ 0.8mm
Additional records				
5616 (sample 74)	31 July '66	7000–6000	45^{0}43 'N. 153^{0}25'E	A-1♀ 0.80, 0.80mm
5612 (sample 77)	31 July '66	6000–5000	45^{0}43 'N. 153^{0}25'E	A-1♀ 0.80mm
5617 (sample 121)	5 Aug '66	7000–6000	45^{0}49 'N. 153^{0}33'E	A-1♀ 0.80mm
5626 (sample 180)	24 Aug '66	9000–7000	45^{0}11 'N. 152^{0}28'E	A-1♂ 0.84mm
5626 (sample 184)	25 Aug '66	6000–5000	45^{0}11 'N. 152^{0}28'E	♂ (lost); A-1 0.80, ♀0.84mm

Redescription of adult female and female (A–1).

Carapace (Fig. 1A–K). Length of adult specimens range from 0.90 to 0.97 mm and immature females (A–1) 0.80 to 0.84 mm. Carapace is very short and high. Its maximum height is equivalent to about 70% of the length, and occurs just anterior to the midline. Hence the anterior half of the shell is slightly larger than the posterior half. The shoulder vaults are well developed but smoothly rounded. The dorsal margin has a clear concavity on the hinge line; the anterior margin of the concavity is at the midpoint of the hinge. The postero-ventral margin is obliquely angled. The rostrum has a pointed tip and is sharply bent down, reaching to about half the shell height or lower The shell is covered with a striking sculpture of reticulations and crosss-striations, forming a pattern of polygonal cells, which are filled with tiny pits. There are symmetrical carapace glands at the postero-dorsal corners, but their openings are somewhat obscured by the sculpturing.

First antenna (Figs. 1L–N, 2B,C). Limb consists of 5 segments. The first and second segments are very thick and contain dark brown pigment spots. The fourth segment bears distally a large plumose seta and ventrally the oval cluster of sensory filaments, which is typical of the genus. The cluster consists of about 200–250, arranged in 8–10 rows with approximately 25 filaments per row. Even though the fifth segment is tiny, it carries the principal seta and two shorter setae; the shorter setae distally become weak and flabby, similar to the filaments in the cluster.

Second antenna (Fig. 2D,E). The basale segment of the exopodite is relatively long and about 66–67% of length of shaft. The second segment of the endopodite is approximately 35% the length of endopodite.

Mandible (Figs. 3A–E, 5E,F). The endite of the basale is armed with only 5 triangular teeth and 4 setae. There is no lateral seta on the basale. The exopodite is represented by three long plumose setae. The first segment of the endopodite bears a single long ventral seta, three disto-medial (only two in immature female) short setae and a single long dorsal seta.

Maxilla (Fig. 4B–E). The first segment of the endopodite has 5 anterior setae (4 proximal and one distal) and 5 posterior setae (one proximal and 4 distal); the second segment is armed with two stout recurved bare claws and 4 ringing setae, the main claw is subequal (or barely longer) in length to the first segment. The basale bears one sets on distal margin. The endite of the precoxale bears one ringing spinous sets adjacent to a stout spinous unringing seta, three unringing claw-like setae and one ringing tubular proximal medial seta. (Fig. 4C). The first endite of the coxale is provided with two long stout pointed and unringing setae, two stout unringing claw-like setae and three ringing tubular setae; second endite is armed with 4 stout unringing claw-like setae and one ringing tubular seta (Fig. 4D).

Fifth limb (Figs. 4F,G, 5A–D). The first endite of precoxale bears one short usual seta and one long seta with long basal hairs, the second endite has 2 short usual setae and one long seta with long basal hairs. The endite of the precoxale is provided with two claw-like setae (one long and one short), 4 long setae with long basal hairs and 2 short usual setae. The basal segment is armed with 7 (3 and 5 on limbs of female N 2781)

ventral and ventro-lateral usual setae and one dorso-lateral plumose seta. The exopodite is represented by one very long bare seta, and it is about 3times as long as the endopodite. The first endopodite segment bears 2–3 ventral setae and one (two on the right limb of female N 2781) dorsal seta (all usual type), the second segment is armed with three setae, of which one dorsal and one middle setae are claw-like and ventral seta is usual type.

Sixth limb (Fig. 6B–E). The epipodial plate is provided has 5, 5 and 6 setae in distal, middle and proximal groups, respectively; there may be an additional proximal short seta, which is obscured by others.The protopodite has a suture distally on ventral margin, which forms triangular process and is without any setae. The basale bears three short-haired, ventral setae and laterally a single plumose lateral seta inserted close to dorsal margin. The exopodite is represented by a single very long seta. It is short-haired (in distal half), fused to basale, extend well beyond the end of the limb and about twice as long as the endopodite. The first exopodite segment is armed with 4–5 ventral setae, and second segment carries one ventral and one dorsal long setae. The dorsal and middle claw-like setae on the terminal segment are slender and long, of which dorsal seta slightly longer and about three times as long as endopodite; middle and ventral setae are subequal in the length.

Caudal furca (Fig. 6F). Each lamella bears 8 slender claws; each with a double row of small teeth along posterior margin and without sutures. There is no unpaired seta. Between bases of claws 1st and 2nd, there is a moderately large elliptical lateral glandular opening.

Redescription of adult male.

Carapace. Deformed in our specimen, but its shape and size is apparently similar to that of the female.

First antenna (Fig. 2A). Similar to the female's, except the fifth segment carries four setae (one long and three short). The long seta of the fifth segment is about double the length of the plumose seta on the fourth segment.

Second antenna (Fig. 4A). Limb deformed. On the first endopodite segment, the b-seta is normal and lacks any proximal swelling; on the second segment, the c- and d-setae are peg-like. The short seta on the right clasper is about one and a half times the length of the second segment.

Mandible. Similar to that of the female except the ventral seta on the first exopodite segment is short whereas it is long in the female.

Maxilla and fifth limb. Similar to the female's.

Sixth limb (Fig. 6A). Marked sexual dimorphism. The basale carries no lateral seta. The seta exopodite is short (the figure shows it to be broken). There are only four setae on the first endopodite segment, but there are short setae on the second. The dorsal seta on the terminal segment is very long and about twice as long as the total length of the endopodite and basale; the ventral and middle setae are short and about 2/3–3/4 the length of the endopodite.

Caudal furca. Similar to the female's.

Copulatory appendage (Fig. 2F). This appendage is relatively short and bluntly rounded at the tip. It is tightly constricted in its central region and then broadens to its maximum height distally. Muscle bands are obscure.

Remarks. This species is closely related to *B. paulula* and *Bathyconchoecia paulula* sensu Kornicker (1991)(= *Bathyconchoecia* undescribed species from Guaymas Basin). Differences between the three species are listed in Table 2.

Table 2. The comparison of characteristics among *Bathyconchoecia paulula, Bathyconchoecia paulula* sensu Kornicker (1991) and *B. pacifica*

Characteristics	***B. paulula***	*B. paulula* sensu Kornicker (1991)	***B. pacifica***
Shell	Female: the rostrum is barely down-bended	Female is unknown	Female: the rostrum is sharply down-bended
	Male: the rostrum is slightly down-bended	Male: the rostrum is sharply down-bended.	Male: the rostrum is sharply down-bended
	Both sex: polygonal cells of sculpture are filled with few tiny pits	Male: polygonal cells of sculpture are filled with few tiny pits.	Both sex: polygonal cells of sculpture are filled with many tiny pits
First antenna	Both sex: moderately slender	Male: thick	Both sex: thick
	Oval cluster bears about 250–300 sensory filaments, arranged in 10–12 rows	Oval cluster bears about 250–300 sensory filaments, arranged in 10–12 rows	Oval cluster bears about 200–300 sensory filaments, arranged in 8–10 rows
	Male: the principal seta on the 5th segment is about 3 times as long as the plumose seta of the 4th segment	Male: the principal seta on the 5th segment is about 3, 5 the length of the plumose seta on the 4th segment	Male: the principal seta on the 5th segment is about twice as long as the plumose seta of the 4th segment
Second antenna	Female: the 2nd endopodite segment is approximately 22% the length of the 1st segment.	Female is unknown.	Female: the 2nd endopodite segment is approximately 35% the length of the 1st segment.
	Male: the bristle "b" on the 1st endopodite segment is usual of type	Male: the bristle "b" on the 1st endopodite segment is with proximal swelling	Male: the bristle "b" on the 1st endopodite segment is usual of type
	Bristles "c" and "d" on the 2nd its segment apparently are usual of type	Bristles "c" and "d" on the 2nd its segment are usual of type	Bristles "c" and "d" on the 2nd its segment are peg-like
	Short seta on the right clasper is considerably longer than the 2nd endopodite segment	Short seta on the right clasper is somewhat longer than the 2nd endopodite segment	Short seta on the right clasper is about one and a half the length of the 2nd endopodite segment
Mandible	Both sex: basal endite is armed with 6 triangular teeth. The lateral seta on the basale is present	Male: basal endite is armed with 6 triangular teeth. The lateral seta on the basale is present	Both sex: basal endite is armed with 5 triangular teeth. The lateral seta on the basale is missing
	Basal endite bears 5 setae	Basal endite bears 4 setae	Basal endite bears 5 setae
	Exopodite is represented by 3 setae	Exopodite is represented by 2 setae	Exopodite is represented by 3 setae.
Maxilla	Both sex: the main claw is subequal (or barely longer) in length to the first endopodite segment	Male: the main claw is shorter than the first endopodite segment	Both sex: the main claw is shorter than the first endopodite segment

Table 2. (continued)

	Both lateral setae on the second endopodite segment are shorter than the endopodite	Both lateral setae are broken	Both lateral setae on the second endopodite segment are longer than the endopodite
	Precoxal endite bears one tooth and 3 long usual bristles	Precoxal endite bears 3 teeth, 2 long usual bristles and 3 tube-bristles	Precoxal endite bears 3 teeth, 2 long usual bristles and one tube-bristles
	First coxal endite is obscured	First coxal endite bears one tooth, 2 long bristles and 3 tube-bristles	First coxal endite bears 2 teeth, 2 long bristles and 3 tube-bristles
	Anterior margin of the endopodite first segment are placed 5 setae	Anterior margin of the endopodite first segment are placed 4 setae	Anterior margin of the endopodite first segment are placed 5 setae
Fifth limb	Male: the basale segment has 6 ventral setae	Male: the basale segment has 4–5 setae	Male: this limb is deformed
	Both sex: The first precoxal endite bears one long and one short setae	Male: the first precoxal endite bears 2 short setae	Both sex: the first precoxal endite bears one long and one short setae
	Female: the basale segment has 7 setae	Female is unknown	Female: the basale segment has 4–7 setae
	Second precoxale endite bears 2 setae	Female is unknown	The second precoxale endite bears 3 setae
Sixth limb	Male: the basale has 2 ventral setae	Male: the basale has 2 ventral setae	Male: the basale has 3 ventral setae
	the exopodite barely reaches to terminal margin of this limb	The exopodite considerably no reaches to terminal margin of this limb	The exopodite considerably no reaches to terminal margin of this limb
	Female: the basale segment has 2 ventral and one lateral setae	Female is unknown	Female: the basale segment has 3 ventral and one lateral setae
Caudal furca	Both sex: there is unpaired seta	Male: there is unpaired seta	Both sex: there is no unpaired seta

Key to *Bathyconchoeicia paulula*, *B. pacifica* and *B. paulula sensu* Kornicker (1991)

1a. Basale of mandible lacks a lateral seta, and carries only 5 triangular teeth on its endite; caudal furca lack an unpaired seta. ..... *B. pacifica* Chavtur, 1977

1b. Basale of mandible with a lateral seta, and carries 6 triangular teeth on its endite; caudal furca is with an unpaired seta ..... 2.

2a. Rostrum is slightly down-bent; first antenna is slender; exopodite of mandible is represented by 3 setae, and basal endite has 5 setae; anterior margin of 1st endopodite segment on maxilla bears 5 setae..... .....*B. paulula* Deevey, 1968

2b. Rostrum is sharply down-bended; first antenna is thick; exopodite of mandible is represented by 2 setae, and basal endite has 4 setae; anterior margin of 1st endopodite segment on maxilla bears 4 setae..... *Bathyconchoecia paulula sensu* Kornicker (1991)

Acknowledgments

The author is greatly indebted to Dr. M.V. Angel (Southampton Oceanography Centre, Great Britain) for improvement of structure and language of manuscript. Also we appreciate the comments and criticism of the manuscript by reviewers. Beside I wish to thank G.G. Stovbun (A.V. Zhirmunsky Institute of Marine Biology, Far East Branch of Russian Academy of Science, Vladivostok, Russia) for technical preparation of manuscript.

Literature cited

Chavtur, V. G. 1977. [Species composition and vertical distribution of pelagic ostracods in region of the Kurile-Kamtchatka Trench]. Sostav i vertikal'noe raspredelenie pelagicheskih ostrakod v rajone Kurilo-Kamchatskoj vpadiny. Trudy Instituta Okeanologii Akademii Nauk SSSR, 108: 136-164 [In Russian].

Chavtur V.G. 1992. [Species composition, structura and distribution of benthic and pelagic ostracods of superorder Myodocopa at the temperate and cold waters of the North Hemisphere]. Sostav, structura i raspredelenie bentosnyh i pelagicheskih ostracod nadotrjada Myodocopa umerennyh i holodnyh vod Severnogo Polusharija. Institut Biologii morija Dalnevostochnoe Otdelenie Rossyjskoj Akademii Nauk. Vladivostok :155, Deponent VINITI/3016–V92. 20 October 1992. (in Russian).

Deevey, G. B. 1968. *Bathyconchoecia*, a new genus of pelagic ostracods (Myodocopa, Halocyprididae) with six new species from the deeper waters of the Gulf of Mexico. Proceedings Biological Society Washington, 81: 539–570.

Kornicker, L. S. 1991. Myodocopid Ostracoda of Hydrothermal vents in the Eastern Pacific Ocean. Smithsonian Contributions to Zoology, 516, 46 pp.

Poulsen, E. M. 1972. Of the *Bathyconchoecia* (Ostracoda, Myodocopa) from the Azores collected by the bathyscaph "Archimede" in 1969. Tethis, 4 (2): 445–456.

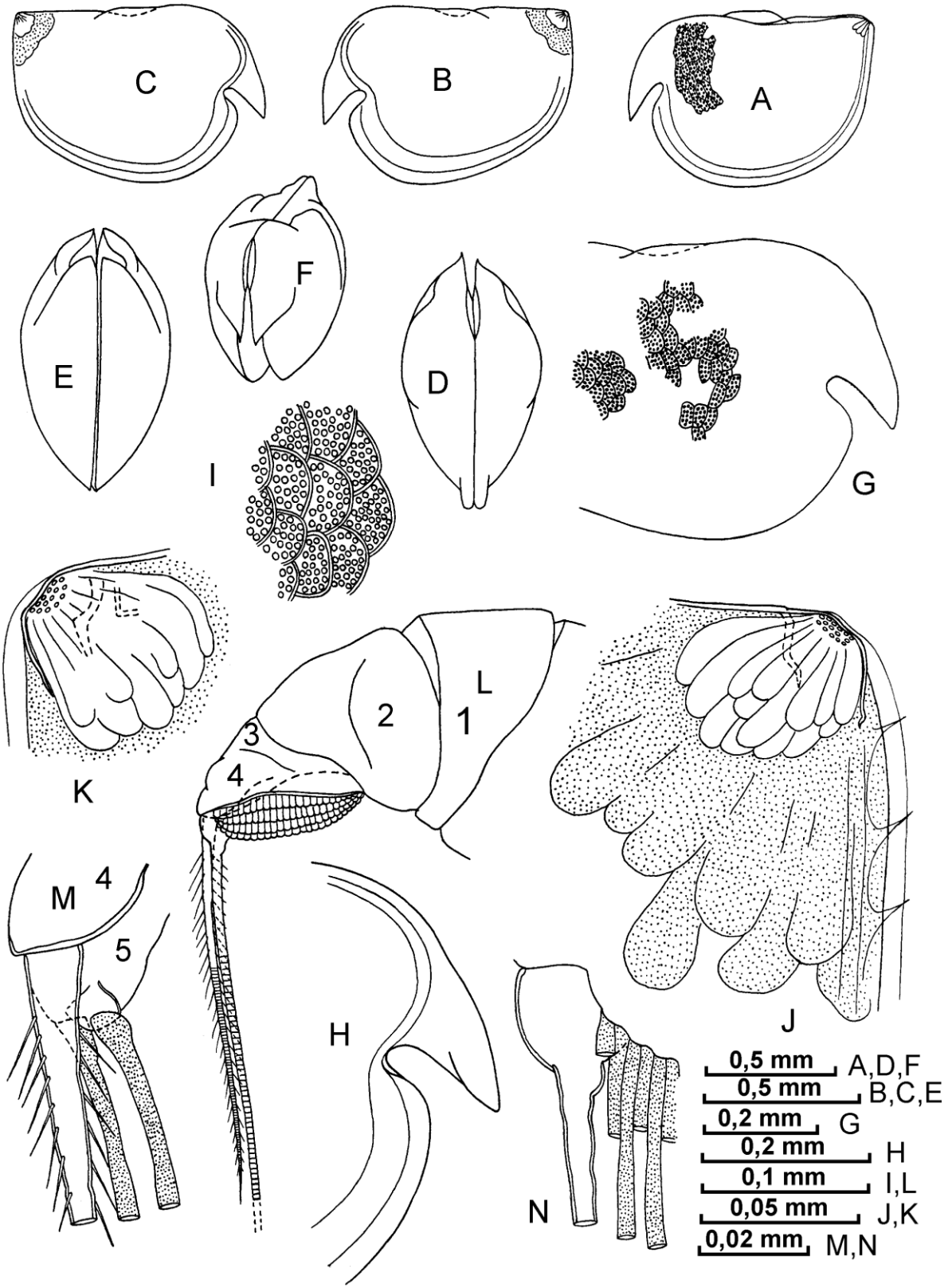

Figure 1. *Bathyconchoecia pacifica* (female: A,D,F - IBM 2780; immature female: B, C, E, G–N - IMB 2782) A,B - right valve of shell in lateral view; C - left valve in lateral view; D–F - shell in dorsal, ventral and anterior views; G, H- anterior part of right and left valves; I - sculpturing on shell; J, K - postero-dorsal angle on left and right valves; L - first antenna; M - fourth and fifth segments of first antenna; N - fourth segment of 1st antenna.

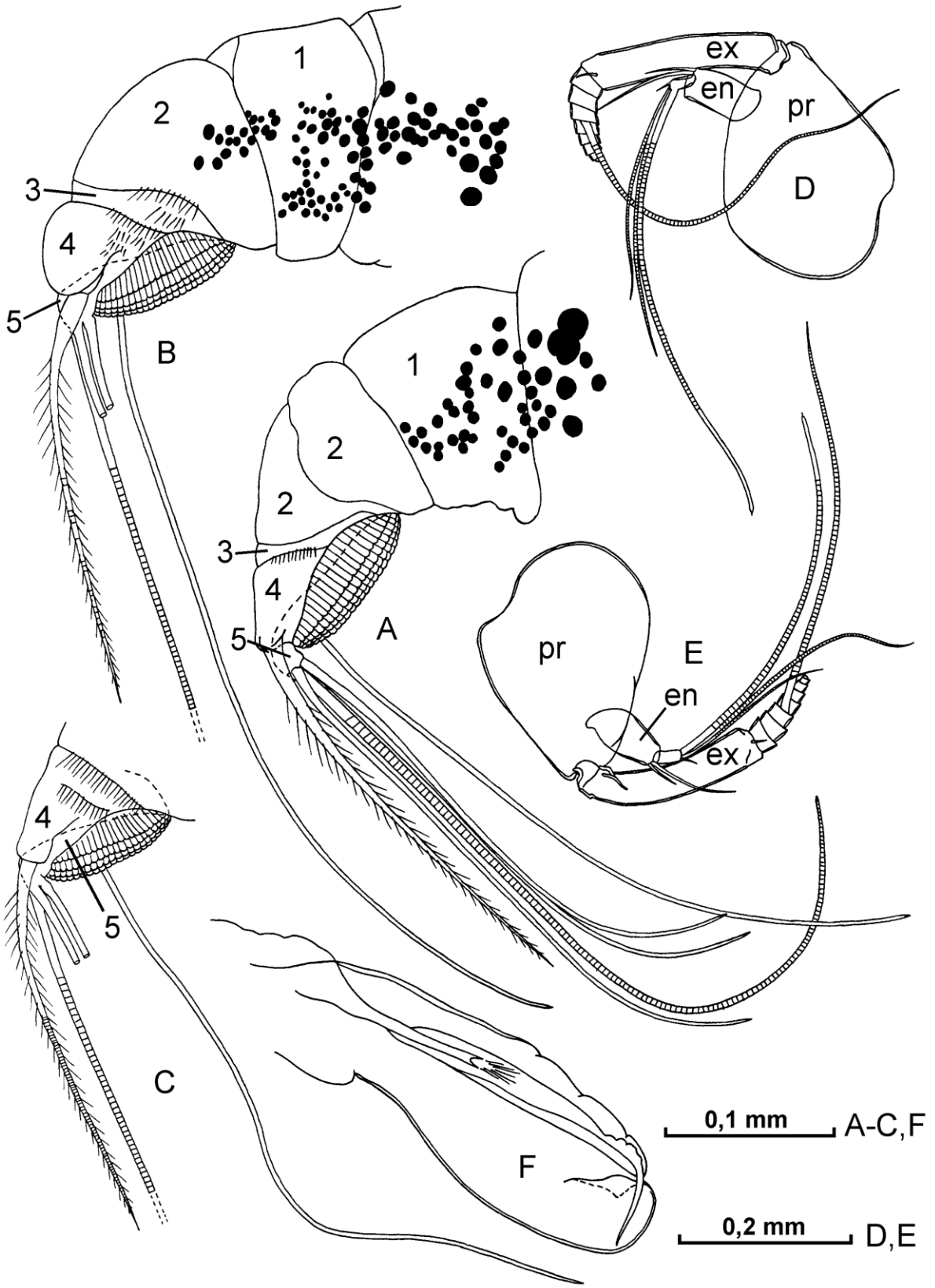

Figure 2. *Bathyconchoecia pacifica* (male [lost]: A,F; female: B,D - IBM 2781; immature female: C,E - IBM 2782) . A,B - first antenna; C - distal part of first antenna; D,E - second antenna; F - copulatory appendage.

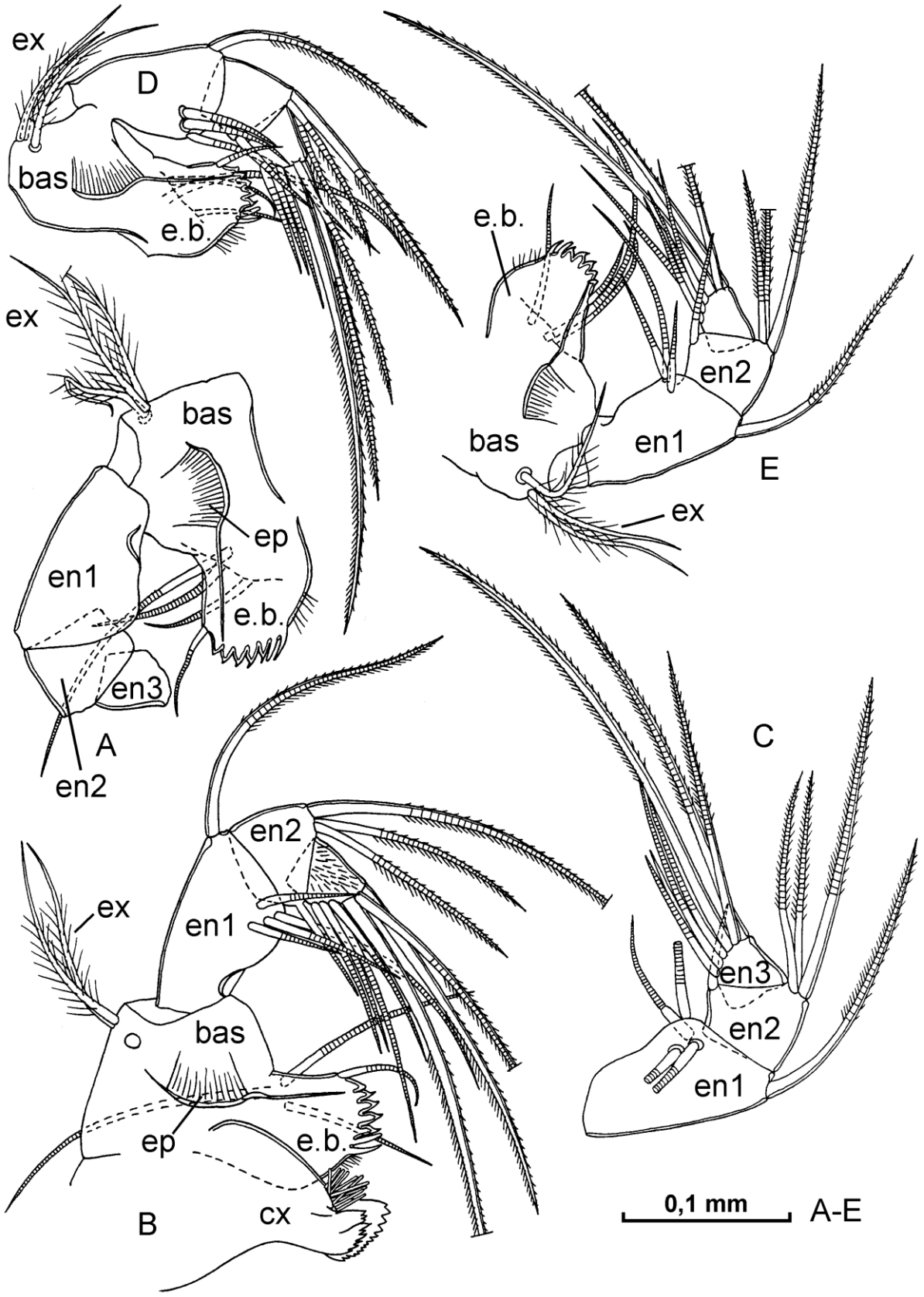

Figure 3. *Bathyconchoecia pacifica* (female: A,B - IBM 2781; C - IBM 2780; immature female: D,E - IBM 2782). A–E - mandible.

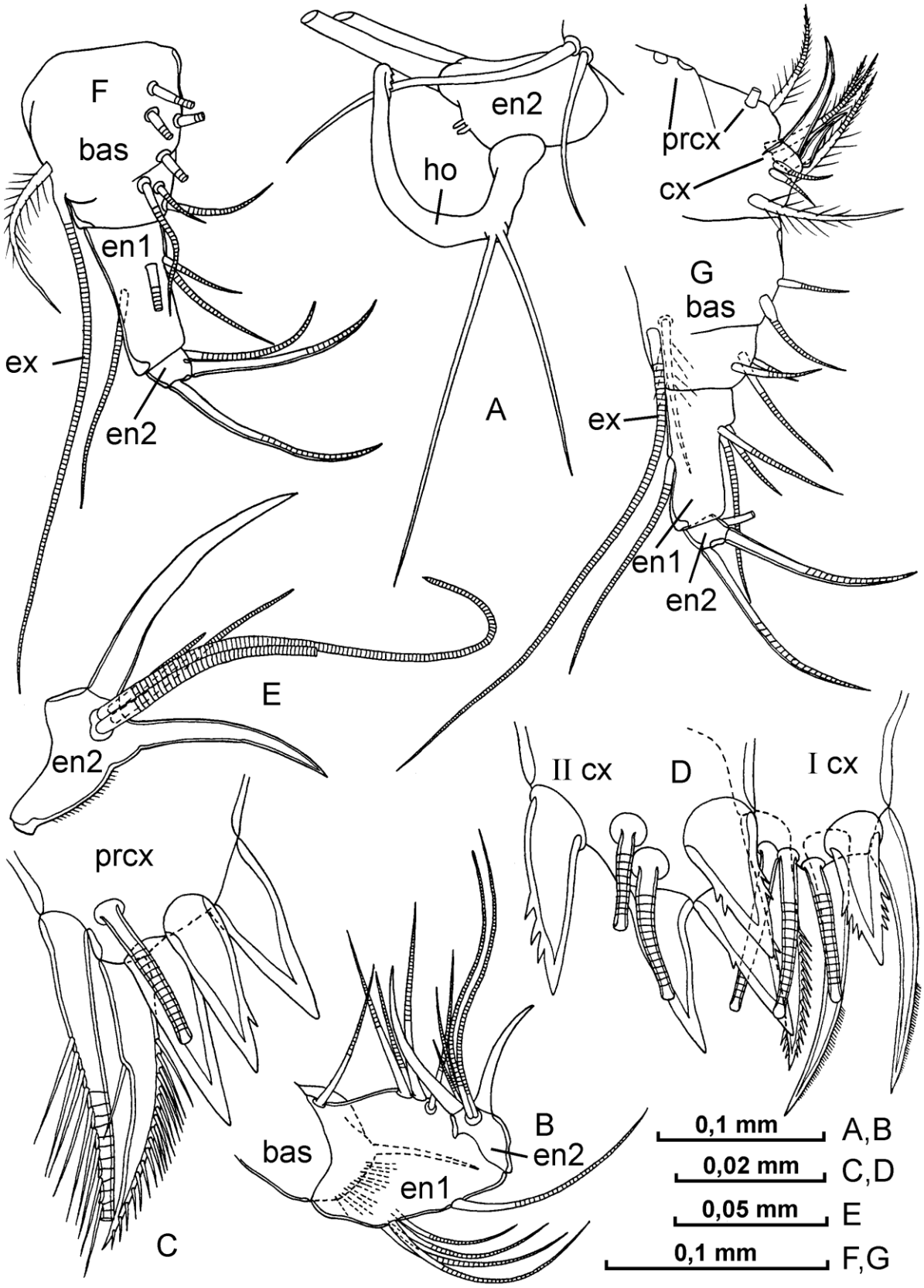

Figure 4. *Bathyconchoecia pacifica* (male [lost]: A; female: B–F - IBM 2781 and G - IBM 2781). A - right endopodite of second antenna (clasper is unscrewed in reverse view); B - maxilla; C, D - coxal and precoxal endites of maxilla; E - distal segment of maxilla; F, G - fifth limb.

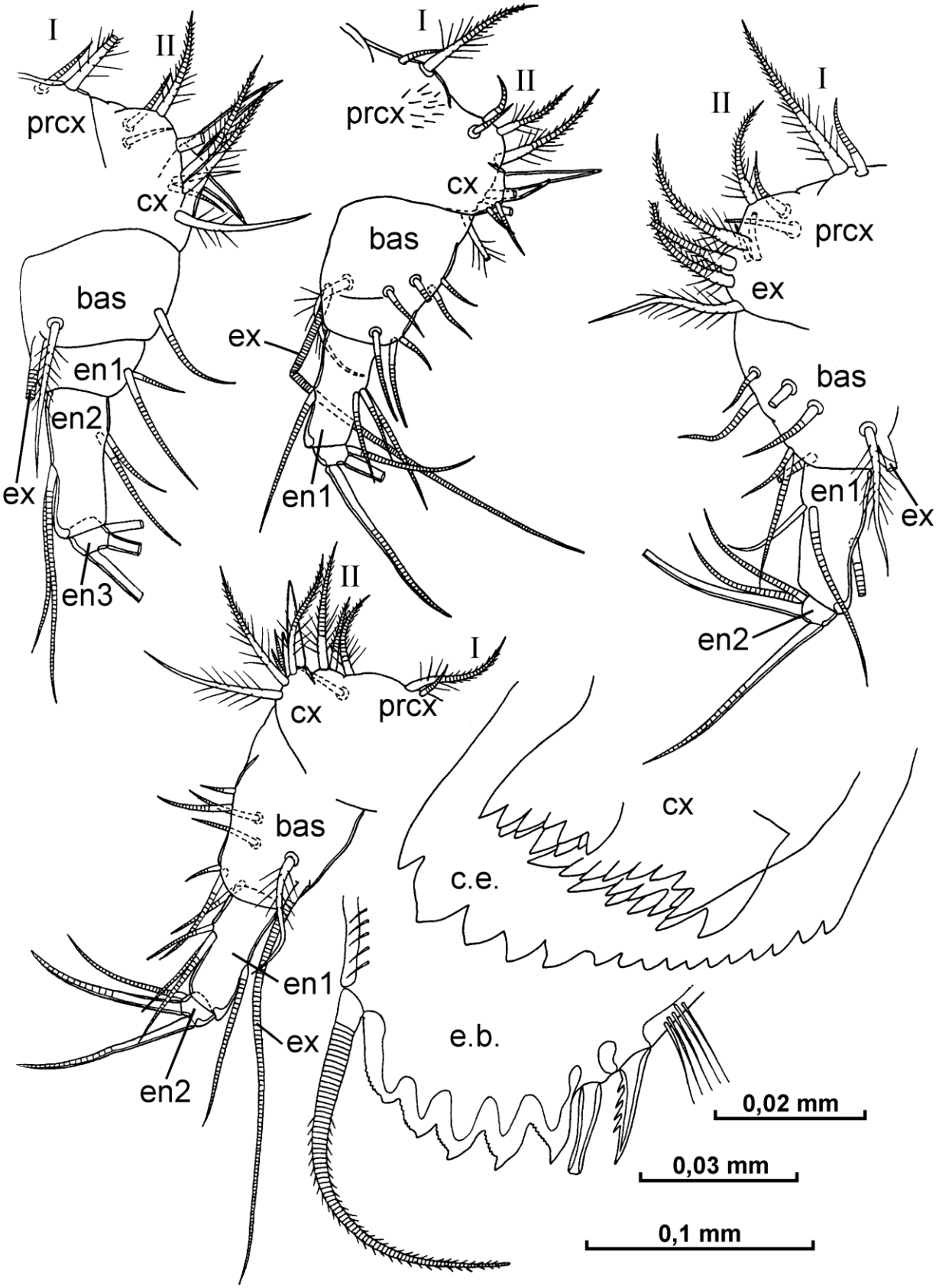

Figure 5. *Bathyconchoecia pacifica* (female: A - IBM 2781 and B,E,F, IBM 2780; immature female: C - IBM 2783 and D - IBM 2782). A–D - fifth limb; E - basal endite of mandible; F- tooth edge and tooth rows on coxale of mandible.

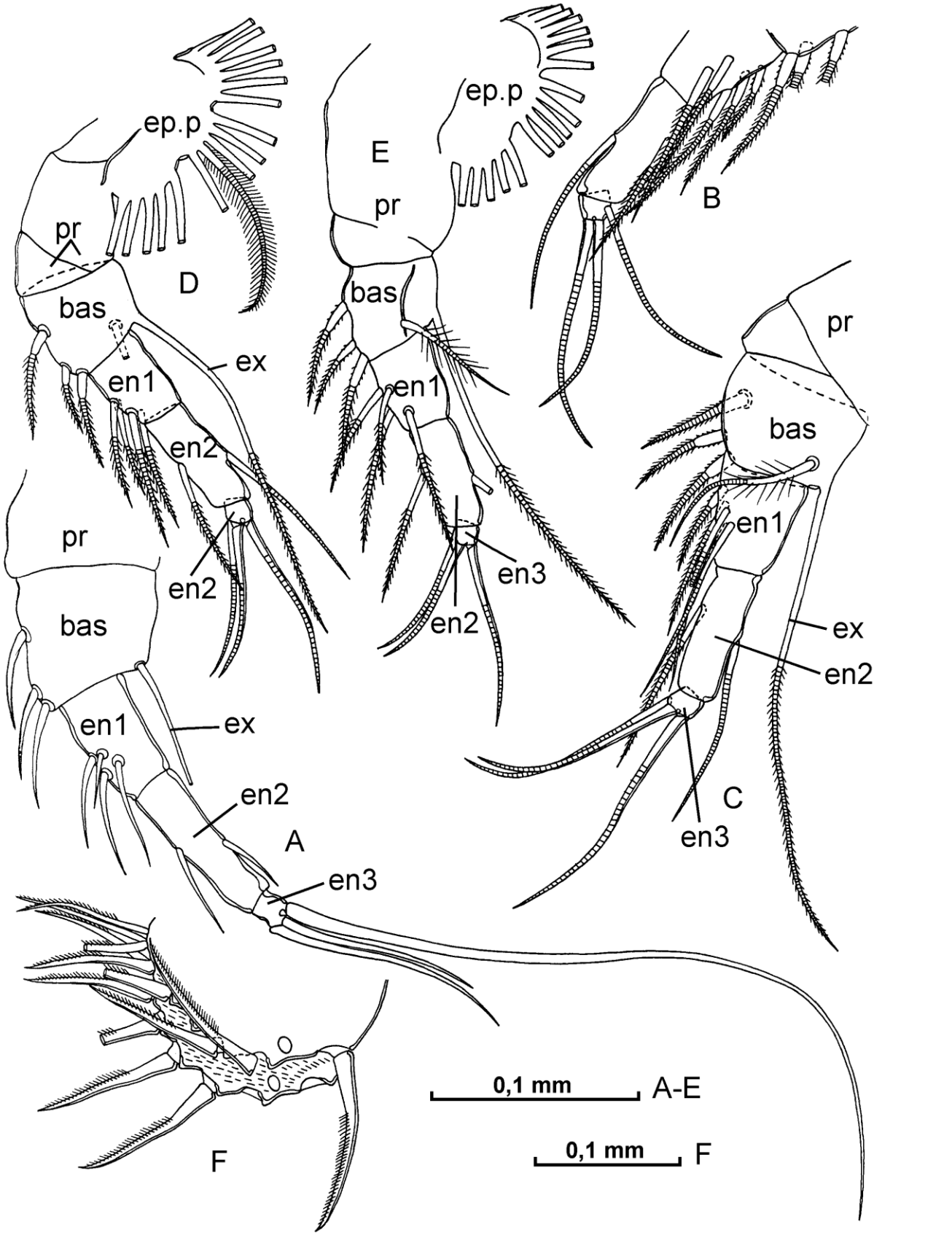

Figure 6. *Bathyconchoecia pacifica* (male [lost]: A; female: B, F - IBM 2780 and C - IBM 2781; immature female: D, E - IBM 2782); A–E - sixth limb; G - caudal furca.